



Response under 37 C.F.R. §1.111
Attorney Docket No.: 990191B
Serial No. 09/994,829

Amendments to the claims:

This listing of claims will replace all prior versions and listing, of claims in the application:

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Listing of Claims:

Claims 1-42 (Canceled).

Claim 43 (Currently Amended): An object extraction apparatus for extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, comprising:

region segmentation means for dividing said object image into a plurality of regions; and extraction means for identifying and extracting the object portion in said object image by a process of consolidating information of each pixel in said object image each for said region,

wherein said process of consolidating information of each pixel in said object image each for said region in said extraction means is the process of averaging information of each pixel in said object image each for said region.

Claims 44 - 46 (Canceled).

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Claim 47 (Currently Amended): ~~The~~ An object extraction apparatus ~~according to claim~~
43, for extracting an object portion by removing an undesired portion from an object image
obtained by shooting an object of interest, comprising:

region segmentation means for dividing said object image into a plurality of regions; and

extraction means for identifying and extracting the object portion in said object image by
a process of consolidating information of each pixel in said object image each for said region,
wherein said extraction means comprises

difference processing means for carrying out a difference process between a background
image obtained by shooting only a background of said object of interest and said object image;

mean value obtaining means for obtaining a mean value of absolute values of difference
obtained by said difference process in said each region, and

threshold value processing means for comparing said mean value of absolute values of
difference in said region with a predetermined value to extract a region having said mean value
of at least said predetermined value as the object portion.

Claim 48 (Currently Amended): ~~The~~ An object extraction apparatus ~~according to claim~~
43, for extracting an object portion by removing an undesired portion from an object image
obtained by shooting an object of interest, comprising:

region segmentation means for dividing said object image into a plurality of regions; and

extraction means for identifying and extracting the object portion in said object image by
a process of consolidating information of each pixel in said object image each for said region,

wherein said extraction means comprises

mean value calculating means for calculating a mean value of pixels in each region of said object image,

difference processing means for carrying out a difference process between a mean value of pixels in each region of said object image and a mean value of pixels in a region of said background image corresponding to said region of said object image, and

threshold value processing means for comparing an absolute value of difference obtained by said difference processing means with a predetermined value to extract a region having said absolute value of difference of at least said predetermined value as the object portion.

Claim 49 (Canceled).

cont
Claim 50 (Currently Amended): An object extraction method for extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, comprising:

a region segmentation step of dividing said object image into a plurality of regions; and
an extraction step of identifying and extracting the object portion in said object image by a process of consolidating information of each pixel in said object image each for said region,

wherein said step of consolidating information of each pixel in said object image each for said region in said extraction step is the process of averaging information of each pixel in said object image each for said region.

Claims 51 - 53 (Canceled).

Claim 54 (Currently Amended): An The object extraction method according to claim 50, for extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, comprising:

a region segmentation step of dividing said object image into a plurality of regions; and
an extraction step of identifying and extracting the object portion in said object image by a
process of consolidating information of each pixel in said object image each for said region,

wherein said extraction step comprises

a difference processing step of carrying out a difference process between a background image obtained by shooting only a background of said object of interest and said object image,

a mean value obtaining step of obtaining a mean value of absolute values of difference obtained by said difference process in said each region, and

a threshold value processing step of comparing said mean value of absolute values of difference in said region with a predetermined value to extract a region having said mean value of at least said predetermined value as the object portion.

Claim 55 (Currently Amended): An The object extraction method according to claim 50, for extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, comprising:

a region segmentation step of dividing said object image into a plurality of regions; and
an extraction step of identifying and extracting the object portion in said object image by a
process of consolidating information of each pixel in said object image each for said region,

wherein said extraction step comprises

a mean value calculating step of calculating a mean value of pixels in each region of said object image,

a difference processing step of carrying out a difference process between a mean value of pixels in each region of said object image and a mean value of pixels in a region of said background image corresponding to said region of said object image, and

a threshold value processing step of comparing an absolute value of difference obtained by said difference processing with a predetermined value to extract a region having said absolute value of difference of at least said predetermined value as the object portion.

Claim 56 (Canceled).

cont
Claim 57 (Currently Amended): A medium storing a program for causing a computer to extract an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, said program comprising:

a region segmentation step of dividing said object image into a plurality of regions; and

an extraction step of identifying and extracting the object portion in said object image by a process of consolidating information of each pixel in said object image each for said region,

wherein said process of consolidating information of each pixel in said object image each for said region in said extraction step is the process of averaging information of each pixel in said object image each for said region.

Claims 58 - 60 (Canceled).

Claim 61 (Currently Amended): An ~~The~~ medium storing the object extraction program ~~according to one of claims 57-59,~~ for causing a computer to extract an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, said program comprising:

a region segmentation step of dividing said object image into a plurality of regions; and
an extraction step of identifying and extracting the object portion in said object image by
a process of consolidating information of each pixel in said object image each for said region,

wherein said extraction step comprises

a difference processing step of carrying out difference processing between a background image obtained by shooting only a background of said object image and said object image,

a mean value obtaining step of obtaining a mean value of absolute values of difference obtained by said difference process in said each region, and

a threshold value processing step of comparing said mean value of an absolute values of difference in said region with a predetermined value to extract a region having said mean value of at least said predetermined value as the object portion.

Claim 62 (Currently Amended): An ~~The~~ medium storing the object extraction program ~~according to claim 57,~~ for causing a computer to extract an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, said program comprising:

a region segmentation step of dividing said object image into a plurality of regions; and
an extraction step of identifying and extracting the object portion in said object image by
a process of consolidating information of each pixel in said object image each for said region,

wherein said extraction step comprises

a mean value calculating step of calculating a mean value of pixels in each region of said object image,

a difference processing step of carrying out a difference process between a mean value of pixels in each region of said object image and a mean value of pixels in a region of said background image corresponding to said region of said object image, and

a threshold value processing step of comparing an absolute value of difference obtained by said difference processing step with a predetermined value to extract a region having said difference absolute value of difference of at least said predetermined value as the object portion.

Claim 63 (Canceled).

Cl. Cont.
Claim 64 (Original): An object extraction apparatus for extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, comprising:

depth information calculating means for calculating depth information of said object image; region segmentation means for dividing said object image into a plurality of regions;

mean value calculating means for calculating a mean value of said depth information each for said region; and

extraction means for extracting as said object portion a region having said mean value within a predetermined range out of said plurality of regions.

Claim 65 (Original): An object extraction method of extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, comprising the steps of: calculating depth information of said object information, dividing said object image into a plurality of regions, calculating a mean value of said depth information each for said region, and extracting as said object portion a region having said mean value within a predetermined range out of said plurality of regions.

Claim 66 (Original): A medium storing a program for causing a computer to extract an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, said program comprising the steps of: calculating depth information of said object information; dividing said object image into a plurality of regions; calculating a mean value of said depth information each for said region; and extracting as said object portion a region having said mean value within a predetermined range out of said plurality of regions.

Claim 67 (Currently Amended): An object extraction apparatus for extracting an object portion by removing a background portion from an object image obtained by shooting an object of interest on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising:

difference means for calculating an absolute value of difference between said object image and said background image;

extraction means for extracting ~~as said object portion~~ a portion of said object image as said object portion having if said absolute value of difference is greater than a threshold value; and

threshold value determination means for determining said threshold value in a statistical manner according to image information distribution of said plurality of background images.

Claim 68 (Currently Amended): An object extraction apparatus for extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising:

calculating means for calculating a mean value and standard deviation of pixels located at same coordinates in said plurality of background images each for said pixel;

difference means for calculating an absolute value of difference between a value of each pixel in said object image and a mean value of pixels in said background image corresponding to said pixel; and

extraction means for extracting ~~as said object portion~~ a pixel out of the pixels in said object image as said object portion having if said absolute value of difference is greater than a predetermined number times said standard deviation out of the pixels in said object image.

Claim 69 (Currently Amended). An object extraction apparatus for extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising:

average/standard deviation calculating means for calculating a mean value and standard deviation of pixels located at the same coordinates in said plurality of background images each for said pixel,

region segmentation means for dividing said object image into a plurality of regions;

difference means for calculating an absolute value of difference between a value of each pixel in each region of said object image and a mean value of corresponding pixels in a region of said background image corresponding to said region;

mean difference calculating means for calculating a mean value of said absolute values of difference each for said region;

mean standard deviation calculating means for calculating a mean value of said standard deviation each for said region; and

extraction means for extracting ~~as said object portion~~ a region out of said plurality of regions as said object portion ~~having~~ if a mean value of said absolute values of difference is greater than a predetermined number times the mean value of said standard deviation ~~out of said plurality of regions~~.

Claim 70 (Currently Amended): An object extraction apparatus for extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising:

average/standard deviation calculating means for calculating a mean value and standard deviation of pixels located at same coordinates in said plurality of background images each for said pixel;

region segmentation means for dividing said object image into a plurality of regions;
mean calculating means for calculating a mean value of pixels in each region of said object image;

difference means for calculating an absolute value of difference between a mean value of pixels in each region of said object image and a mean value of pixels in a region of said background image corresponding to said region;

mean difference calculating means for calculating a mean value of said absolute value of difference each for said region; mean standard deviation calculating means for calculating a mean value of said standard deviation each for said region; and

extraction means for extracting ~~as said object portion~~ a region out of said plurality of regions as said object portion ~~having if~~ a mean value of said absolute value of difference is greater than a predetermined number times the mean value of said standard deviation ~~out of said plurality of regions~~.

Cont. Claim 71 (Currently Amended): An object extraction apparatus for extracting an object image by removing an undesired portion from an object image on the basis of a plurality of object images obtained by shooting an object of interest a plurality of times and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising:

means/standard deviation calculating means for calculating a mean value and standard deviation of pixels located at same coordinates in said plurality of background images each for said pixel;

mean calculating means for calculating a mean value of pixels located at same coordinates in said plurality of object images each for said pixel; region segmentation means for dividing said object image into a plurality of regions;

difference means for calculating an absolute value of difference between said mean value of each pixel in each region of said object image and said mean value of corresponding pixel in a region of said background image corresponding to said region;

mean difference calculating means for calculating a mean value of said absolute value of difference each for said region;

mean standard deviation calculating means for calculating a mean value of said standard deviation each for said region; and

extraction means for extracting ~~as said object portion~~ a region out of said plurality of regions as said object portion ~~having~~ if a mean value of said absolute value of difference is greater than a predetermined number times the mean value of said standard deviation ~~out of said plurality of regions~~.

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Claim 72 (Currently Amended): An object extraction method of extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising the steps of:

determining statistically a threshold value according to distribution of said plurality of background images;

calculating an absolute value of difference between said object image and said background image; and

extracting ~~as said object portion~~ a portion of said object image as said object portion ~~having~~ if said absolute value of difference is greater than said threshold value.

Claim 73 (Currently Amended): An object extraction method of extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of the interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising the steps of:

calculating a mean value and standard deviation of pixels located at the same coordinates in said plurality of background images each for said pixel;

calculating an absolute value of difference between a value of each pixel in said object image and a mean value of pixels in said background image corresponding to said pixel; and

extracting ~~as said object portion~~ a pixel out of the pixels in said object image as said object portion ~~having if~~ said absolute value of difference is greater than a predetermined number times said standard deviation ~~out of said plurality of regions~~.

Claim 74 (Currently Amended): An object extraction method of extracting an object portion by removing a background portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising the steps of:

calculating a mean value and standard deviation of pixels located at the same coordinates in said plurality of background images each for said pixel;

dividing said object image into a plurality of regions;

calculating an absolute value of difference between a value of each pixel in each region of said object image and a mean value of corresponding pixels in a region of said background image corresponding to said region;

calculating a mean value of said absolute value of difference each for said region;
calculating a mean value of said standard deviation each for said region; and

extracting ~~as said object portion~~ a region out of said plurality of regions as said object
portion ~~having~~ if said absolute values of difference is greater than a predetermined number times
said standard deviation ~~out of said plurality of regions~~.

Claim 75 (Currently Amended): An object extraction method of extracting an object
portion by removing an undesired portion from an object image obtained by shooting an object
of the interest, on the basis of said object image and a plurality of background images obtained
by shooting only a background of said object of interest a plurality of times, comprising the steps
of:

calculating a mean value and standard deviation of pixels located at the same coordinates
in said plurality of background images each for said pixel;

dividing said object image into a plurality of regions;

calculating a mean value of pixels in each region of said object image; calculating an
absolute value of difference between a mean value of pixels in each region in said object image
and a mean value of pixels in a region of said background image corresponding to said region;

calculating a mean value of said absolute value of difference each for said region;

calculating a mean value of said standard deviation each for said region; and

extracting ~~as said object portion~~ a region out of said plurality of regions as said object
portion ~~having~~ if a mean value of standard deviation is greater than a predetermined number
times the mean value of said standard deviation ~~out of said plurality of regions~~.

Claim 76 (Currently Amended): An object extraction method of extracting an object portion by removing an undesired portion from an object image on the basis of a plurality of object images obtained by shooting an object of interest a plurality of times and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising the steps of:

calculating a mean value and standard deviation of pixels located at the same coordinates in said plurality of background images each for said pixel;

calculating a mean value of pixels located at the same coordinates in said plurality of object images each for said pixel;

dividing said object image into a plurality of regions; calculating an absolute value of difference between said mean value of each pixel in each region of said object image and said mean value of corresponding pixel in a region of said background image corresponding to said region;

calculating a mean value of said absolute value of difference each for said region; calculating a mean value of said standard deviation each for said region; and

extracting ~~as said object portion~~ a region out of said plurality of regions as said object portion ~~having if~~ a mean value of said absolute value is greater than a predetermined number times the mean value of said standard deviation ~~out of said plurality of regions~~.

Claim 77 (Currently Amended): A medium storing a program for causing a computer to extract an object portion by removing an undesired portion from an object image obtained by shooting an object of interest on the basis of said object image and a plurality of background

images obtained by shooting a background of said object of interest a plurality of times, said program comprising the steps of:

determining statistically a threshold value according to distribution of said plurality of background images;

calculating an absolute value of difference between said object image and said background image; and

extracting ~~as said object portion~~ a portion of said object image as said object portion ~~having~~ if said absolute value of difference is greater than said predetermined value.

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Claim 78 (Currently Amended): A medium storing a program for causing a computer to extract an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, said program comprising the steps of:

calculating a mean value and standard deviation of pixels located at the same coordinates in said plurality of background images each for said pixel;

calculating an absolute value of difference between a value of each pixel in said object image and a mean value of pixels in said background image corresponding to said pixel; and

extracting ~~as said object portion~~ a pixel out of the pixels in said object image as said object portion ~~having~~ if said absolute value of difference is greater than said predetermined number times said standard deviation ~~out of the pixels in said object image~~.

Claim 79 (Currently Amended): A medium storing a program for causing a computer to extract an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, said program comprising the steps of:

calculating a mean value and standard deviation of pixels located at the same coordinates in said plurality of background images each for said pixel;

dividing said object image into a plurality of regions; calculating an absolute value of difference between a value of each pixel in each region of said object image and a mean value of corresponding pixels in a region of said background image corresponding to said region;

calculating a mean value of said absolute value of difference each for said region; calculating a mean value of said standard deviation each for said region; and

extracting ~~as said object portion~~ a region out of said plurality of regions as said object portion ~~having~~ if a mean value of said absolute values of difference is greater than a predetermined number times the mean value of said standard deviation ~~out of said plurality of regions.~~

Claim 80 (Currently Amended): A medium storing a program for causing a computer to extract an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, said program comprising the steps of:

calculating a mean value and standard deviation of pixels located at the same coordinates in said plurality of background images each for said pixel;

dividing said object image into a plurality of regions;

calculating a mean value of pixels in each region of said object image;

calculating an absolute value of difference between a mean value of pixels in each region in said object image and a mean value of pixels in a region of said background image corresponding to said region;

calculating a mean value of said absolute value of difference each for said region;
calculating a mean value of said standard deviation each for said region; and

cont.
extracting ~~as said object portion~~ a region out of said plurality of regions as said object portion having if a mean value of said absolute value of difference is greater than a predetermined number times the mean value of said standard deviation ~~out of said plurality of regions~~.

Claim 81 (Currently Amended): A medium storing a program for causing a computer to extract an object portion by removing an undesired portion from an object image on the basis of a plurality of object images obtained by shooting an object of interest a plurality of times and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, said program comprising the steps of:

calculating a mean value and standard deviation located at the same coordinates in said plurality of background images each for said pixel;

calculating a mean value of pixels located at the same coordinates in said plurality of object images each for said pixel;

dividing said object image into a plurality of regions; calculating an absolute value of difference between said mean value of each pixel in each region of said object image and said mean value of corresponding pixel in a region of said background image corresponding to said region;

calculating a mean value of said absolute value of difference each for said region;

calculating a mean value of said standard deviation each for said region; and

extracting ~~as said object portion~~ a region out of said plurality of regions as said object portion ~~having if~~ a mean value of said absolute value of difference is greater than a predetermined number times the mean value of said standard deviation ~~out of said plurality of regions.~~

Claims 82 – 94 (canceled).

Claim 95 (Currently Amended): An object extraction apparatus for extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising:

mean/standard deviation calculating means for calculating a mean value and standard deviation of pixels located at the same coordinates in said plurality of background images each for said pixel;

region segmentation means for dividing said object image into a plurality of regions;

mean calculating means for calculating a mean value of pixels in each region of said object image and a mean value in each region of the mean value of pixels in the background image;

difference means for calculating an absolute value of difference between a mean value of pixels within each region of said object image and a mean value in the region of pixels in a region of said background image corresponding to said region;

mean standard deviation calculating means for calculating a mean value of said standard deviation each for said region; and

extraction means for extracting ~~as the object region~~ a region out of said plurality of regions as the object region ~~having if~~ an absolute value of difference is greater than a predetermined number times the mean value of said standard deviation ~~out of said plurality of regions~~.

Claim 96 (Currently Amended): An object extraction method of extracting an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising the steps of:

calculating a mean value and standard deviation of pixels located at the same coordinates in said plurality of background images each for said pixel;

dividing said object image into a plurality of regions; calculating a mean value of pixels in each region of said object image and a mean value in each region of the mean value of the pixels in the background image;

calculating an absolute value of difference between a mean value of pixels within each region of said object image and a mean value in the region of pixels in a region of said background image corresponding to said region;

calculating a mean value of said standard deviation each for said region; and

extracting ~~as the object portion~~ a region out of said plurality of regions as the object portion ~~having if~~ an absolute value of difference is greater than a predetermined number times the mean value of said standard deviation ~~out of said plurality of regions~~.

Claim 97 (Currently Amended): A medium storing a program for causing a computer to extract an object portion by removing an undesired portion from an object image obtained by shooting an object of interest, on the basis of said object image and a plurality of background images obtained by shooting only a background of said object of interest a plurality of times, comprising the steps of:

calculating a mean value and standard deviation of pixels located at the same coordinate in said plurality of background images each for said pixel; dividing said object image into a plurality of regions;

calculating a mean value of pixels in each region of said object image and a mean value in each region of the mean values of the pixels of the background image;

calculating an absolute value of difference between a mean value of pixels within each region of said object image and a mean value in the region of pixels in a region of said background image corresponding to said region;

calculating a mean value of said standard deviation each for said region; and

extracting ~~as the object portion~~ a region out of said plurality of regions as the object
portion ~~having~~ if an absolute value of difference is greater than a predetermined number times
the mean value of said standard deviation ~~out of said plurality of regions~~.

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